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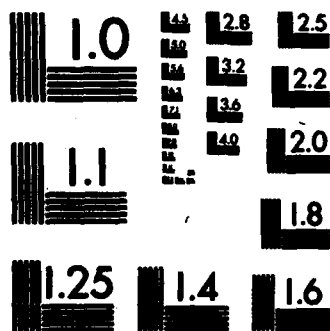


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AUTHOR: HANS-JÜRGEN WITTHÖFT

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New Developments for Soviet Arctic Shipping

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Our veteran collaborator for matters of merchant shipping examines the current efforts of the USSR to expand the utilization of Arctic Shipping Routes.

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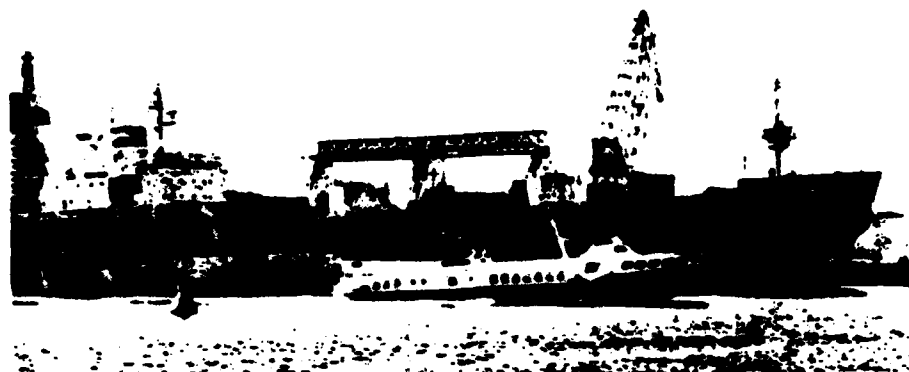


Fig. 1: The DMITRI DONSKOI belongs to the series of ice-navigation reinforced bulk carriers, which have been built in the GDR for use in the northern (Arctic) sea route.

The expansion of the merchant marine in the Soviet Union continues as before to enjoy a high priority. The reasons for this priority are multi-faceted. As before both economic and strategic considerations are the critical issues. Similarly the effort is being made to solve the internal Soviet transportation problems in this manner. This means also that major efforts are being exerted to prosecute the further development of harbor facilities. It can be noted that on a regional basis maximum priority is being accorded to the exploitation of the Arctic region.

According to Soviet statistics merchant shipping provides for 12% of Soviet transportation requirements. 92% of the performance and services of the Soviet merchant marine applies to international trade and commerce. Ships flying the Soviet flag use 1,400 harbors in more than 120 countries. In the 1976/80 Five-Year Plan goods totalling some 228 million tons were transported by Soviet merchant ships; this is 14% more than in the previous five-year plan.

The Soviet Ministry for High Seas Shipping (Minmorflot) also realized a positive balance for the year 1981. The plans were overfilled according to the statistics published both for coastal shipping with a transport volume increased by 3% and in international shipping with an increase of some 12%. According to the statistics the container traffic also increased by 4%.

The newly realized capability of year-round shipping in the Arctic Ocean over the harbor Dudinka is regarded as being a particular triumph. Therefore the developing areas of Siberia can be provided with supplies now even during the winter.

The capability of wood export over the harbor Igarka on the Yenissei /377 is also regarded as being of major importance in this context. As opposed to this, irregularities in the Far East shipping traffic have generated official criticism and a series of problems, which are associated with the expansion of the container traffic.

The Soviet Union intends to invest nominally as much in the current five-year plan as in the previous five-year plan. The number of new ships acquired will however be less, not at the least because of the considerably increased ship construction prices abroad (the own shipyards are primarily filled with naval ship construction). The plan projects an expansion of the tonnage by 3.8% to 19.2 million deadweight tonnage.

The new construction of 250 merchant ships with a total of 3.2 million tons deadweight is planned. If the targetted 19.2 tons deadweight total is used as a basis, this means a net increase of 0.7 million tons deadweight. On this basis of this calculation, then 2.5 million tons deadweight would have to be sold or discarded.

Again general cargo and liner tonnage has the priority in these plans. The percentage, which applies to this area of the merchant fleet, will rise from 59.1% in 1980 to 63.1% in 1985 according to statistics published by Minmorflot. Western shipping firms will derive little pleasure from these figures, because the dumping policy with which the Soviet Union fills its ships in many major shipping areas, particularly in East Africa and Central America, has not at all abated, despite promising innuendoes by the Russians during the German-Soviet shipping negotiations in mid-1981.

The trend for an increasing specialization within the Soviet merchant fleet can be clearly noted, which therefore is going the way which international shipping has been going for some time, in order to rationalize maritime shipping with technology to the greatest possible degree. In this regard the Soviet merchant fleet is being expanded in the current five-year plan, particularly by Ro/Ro and container ships, wood freighters, refrigerator ships, barge-carriers, and cargo ships strengthened for ice-navigation. Particularly the Ro/Ro ships have priority with the Soviets. Already today they control one of the largest Ro/Ro fleets in the world. The first of a series of new freighters of this type was launched in mid-1982 in Leningrad. This new ship type is a version stretched by 12 meters of the 12,000 ton dead-weight carriers previously built there. Ro/Ro freighters are reported as being built also at Nikolaev in the Black Sea. Additional special ships of this type are being provided by Finnish, Polish and French shipyards.

The fleet of the support ships: icebreakers, large tugboats, repair and maintenance ships, dredges, etc. is also being expanded with extensive funding allocations.

Northern Sea Route/Arctic Shipping Area

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The most important objective of the Soviet economic planning is the all-year shipping along the European and Asiatic coasts, from Murmansk on the Kola Peninsula through the littoral seas of the Arctic Ocean (Barents Sea, Kara Sea, Laptev Sea, East Siberian Sea, Chukchi Sea, Bering Straits) to the Bering Sea. This is the path of the so-called "Northern Sea Route", which for most of the year is covered with pack ice on its ca.

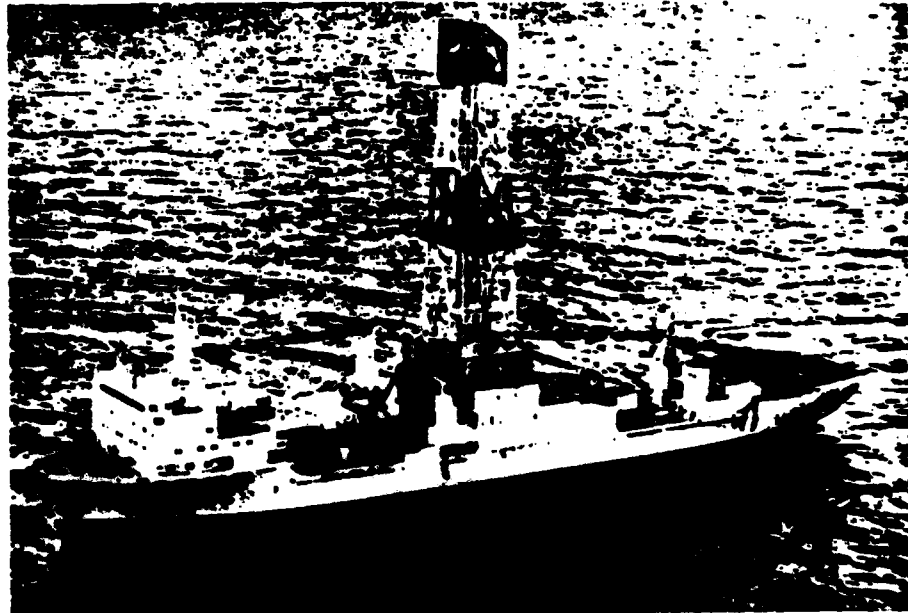


Fig. 2: VALENTIN SHASHIN - the first of three ice-reinforced drilling ships, which were built by the Mäntyluoto Shipyard of the Finnish Rauma Repola Concern for the Soviet Union in 1982.

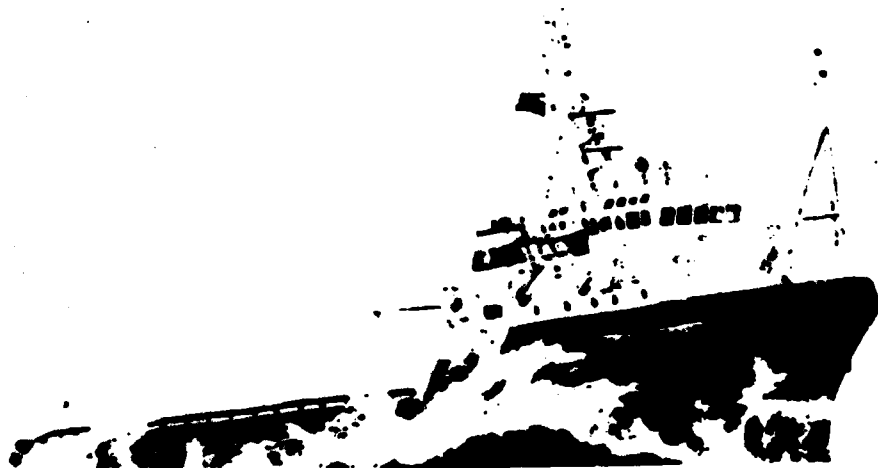
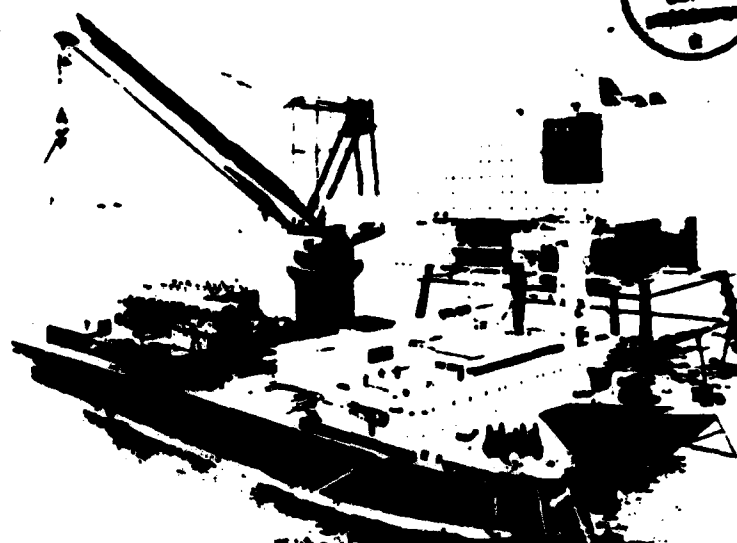


Fig. 3: Tender for Arctic operations.

7,000 km length. The exploration of this sea route was the objective of numerous expeditions, of which however only few reached the predicated objective. Many ships were crushed by the ice or were forced to turn back because of insuperable ice barriers. The Swedish geographer and Polar explorer Adolf Erik Nordenskjöld (1832-1901) succeeded in 1878/79 with the VEGA-expedition in navigating this sea route for the first time and discovered the North-East passage. From 1914 to 1915 as the first Russian ships the TAIMUR and the WALGACH succeeded in navigating this route, and after them the Norwegian Amundsen successfully navigated the Northern sea route. Whereas in the 1920's the navigation period in the western section of the sea route was ca. 35 days, in 1932 with the regular operation of icebreakers this period could be expanded in the



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Fig. 4 : Lifting ship with 600-ton lifting capability.

western section to 107 days and in the eastern section to 79 days. /378
During WWII, in addition, a German merchant cruiser passed the Northern Sea Route with Soviet assistance. This was the KOMET in 1940 under Kapitän zur See (CAPT) and later Konteradmiral (Rear Admiral) Robert Eyssen.

For some 20 years the Soviet Union has had the largest icebreaker fleet in the world, which occasionally generated international sensation with its spectacular new constructions. In 1965, for example, it was the LENIN as the first icebreaker with nuclear propulsion and at that time as well the largest icebreaker in the world. With this ship and the other new units MODKVA, LENINGRAD and KIEV the transport capability on the Northern Sea Route could be increased by a further 80%.

With the operation of other icebreakers with diesel-electric propulsion and with the assistance of the new icebreakers with nuclear propulsion, ARKTIKA and SIBIR (1975) each with 55,000 kW propulsive power, the objective of all-year navigation could be realized at least for the Western section to the mining and metallurgical center Dudinka. The production there had until that time suffered from the irregular transport connections. Production could be operated only on an irregular basis and because of this caused high costs.

The nuclear icebreaker ARKTIKA succeeded in reaching the North Pole on 17. August 1966. With this cruise the information could also be obtained, which was used for the further opening of the Northern Sea Route.

In 1980 the Soviet Union has over 38 icebreakers with a total of 213,600 gross tons. Many of these ships were built in Finland. As well, the Soviet Union also has extensive experience in this area. The basis for the icebreaker research was laid in 1955, when in the Leningrad Arctic/Antarctic Institute an ice-model testing basin was built. This was the first test facility of this type in the world.

In the interim the construction of the fourth Soviet nuclear icebreaker has been initiated at the Baltic Shipyard in Leningrad. The ship will have a displacement of 23,640 and a speed of 21 kn.

Because of the shallow water depths in the Arctic waters and because /3 of the critical requirement of also being able to reach harbors in river estuaries, in the use of the sea route the convoy system has been adopted. In this procedure an icebreaker makes a channel. The following freighters always have approximately the same beam and the same draft as the icebreaker. The speed of such a convoy is approximately 8 knots. Control stations are installed on the coast, which are responsible for the assembly of the convoys and the safe passage of the ships through the route.

It should also be noted that the Northern Sea Route is not only of critical importance for the exploitation and development of the northern region of the Soviet Union, but also shortens the distances between European harbors and Far Eastern harbors considerably. In this regard, the sea distance from Murmansk through the Suez Canal to Vladivostok is approximately 12,800 sm; the distance is only 5,000 sm over the Northern Sea Route; the distance Leningrad-Suez Canal-Vladivostok is 12,600 sm; the distance through the Arctic ice is approximately 6,000 sm.

The Arctic Ocean area is regarded by many observers as being the key to the economic future of the USSR. Its future is closely associated with the ambitious plans for opening and developing the Arctic region, with the objective of all-year (year-round) navigation on the Northern Sea Route. The emphasis with which the objective of all-year navigation on the Northern Sea Route is being prosecuted, is all the more comprehensible if it is considered that in the vast region, which is blessed with incalculable natural resources, road and rail transportation either does not exist or is inadequate. The possibilities which the coastal route together with the extensive river system offers, particularly the Ob, Lena and Jenissei, could act as a substitute for the inadequate road and rail systems.

In order to realize these plans, an extensive maritime infrastructure has to be installed in the entire region. This extends from the construction of new harbors and the expansion of existing facilities to the maintenance of appropriate, i.e., large and powerful icebreaker and dredger fleets and to the building of shipyard repair facilities. In the following some examples of the great efforts are noted, which are being made for the expansion of this fleet.

Ships for The Arctic

A rather large series of ice-reinforced bulk cargo freighters of the DMITRI DONSKOI Class (Fig. 1) has been built by the Warnowwerft in Warnemünde. The 20,000 ton dead-weight ships which are rated at 13,900 gross register tons has the highest ice class of the ship register of the USSR. They operate in convoy between Murmansk and Dudinka. Iron ore concentrate is loaded at Dudinka and in the opposite direction bulk goods and containers are carried. The length of the freighters is 143.9 meters, beam 22.9, draft 9.9 m and engine power 8,240 kW.

The Soviet Union has begun the exploitation of the new vast offshore oil and gas regions in the extreme environment of the East Antarctic between Spitzbergen and West Siberia (Barents Sea with its eastern extension, the Pechora Sea, Kara Sea between Novaya Zemlya and the mainland). For this purpose drilling ships and tenders (supply ships) have been ordered in Finland. With the drilling ships (Fig. 2), which

were built at the Rauma Repola's Mäntyluoto Shipyard, they are copies /380 of the Dutch PELIKAN type - delivery of the third and last unit - which are reinforced in such a manner, that they are fully capable of ice navigation. They can - when they are dynamically positioned - perform drilling up to a depth of 6,000 meters at a maximum water depth of 300 meters. The dynamic positioning, which is very complex in operation and installation, is normally used only in rather great water depths, in which a chain anchoring is no longer possible. It can be assumed from this that with these ships it is necessary, because they always drill in ice-threatened waters, in which rapid change of position can be necessary. As a special feature of these ships, which displace 7,500 ton dead-weight ships with a length of 149.42, and maximum draft of 7.30 m, it is noted that they are capable of stopping a running drill within only three minutes, i.e., they can disconnect the drilling system in board from the drill operating at depth. This is possible only in conjunction with the dynamic positioning.

The initial four tenders (Fig. 3) have been ordered from the Finnish Oy Wärtsilä AB. They are intended to be used in the Arctic oil field regions inter al. as diver base ships. They are 67.7 m long, 13.8 wide and have a draft of 4.7 m. As the main propulsion they have two Wärtsilä diesel motors of the Type 9R32 with a total of 6,140 kW.

The Wärtsilä Shipyard in Turku has obtained valuable orders for lifting ships (Crane ships) and dredges. Three 6,00-ton lift lifting ships and two suction dredges are scheduled for delivery in 1984/85, and in 1985 another lifting ship with a lifting capacity of 1,600 tons is scheduled for delivery. Alone the contract value of the last cited ship is estimated as 234 million DM. From this it can be noted that certainly the Soviet Union is profiting to a large degree from the special Finnish know-how in the construction of special ships for ice navigation and that on the other hand the Finnish shipyard industry realizes an excellent activity with the construction for its mighty neighbour, and that the other shipbuilding countries are indeed envious of these orders. According to rumor, these prices are from "very good" to "even better".

The three lifting ships (Fig. 4) are built in double-hull (catamaran) configuration. In this configuration they are unique. They are designed for transport and installation activities in the offshore region. In the design special emphasis was directed to the fact that they can operate both in Arctic regions up to minus 30 degrees (C) and in the tropics at temperatures up to 45 degrees (C). The 600-ton crane (lifting ship) has a reach of 40 meters and installed on one of the two hulls. The deck surface is 5,000 m² and provides space for bulky and heavy equipment (for example, construction sections). The main dimensions are: LOA 141.4 m, beam 54 m, draft 4.0, propulsion 4,440 kW.

The lifting ship with 1,600-ton capacity (Fig. 5), which is scheduled for delivery in 1985, is intended for the same operational region; the clients has an option for another ship of this type. The new construction is 179.8 m long, beam 36.0 m, and draft 8.9 m. A speed of 11.5 kn with three diesel motors is reported. The crane of the ship is installed on the aftership and has a traverse of 360°. The maximum lifting power is obtained at an extension (reach) of 48.5 meters up to a height of 60 meters. Although the Wärtsilä Shipyard states that the design is the culmination of a long development process, the similarity of the design with the lifting ships E.T.P.M. 1601 and SEA TROLL, which were built at the Hamburg Shipyard Blohm + Voss several years ago.

In regard to the two suction dredges (Fig.6) mentioned, which /380
were also ordered at at Wärtsilä/Turku, it can also be noted that they
can be employed in extremely shallow water both in stationary and mobile
mode. In mobile operation the direction of movement during dredging
is controlled by two propeller systems. The dredging capacity is 3,000
m³ sand per hour. The length of the dredge is 100 m, beam 16 and draft
3.5 m. The propulsion power is reported as being 6,800 kW.

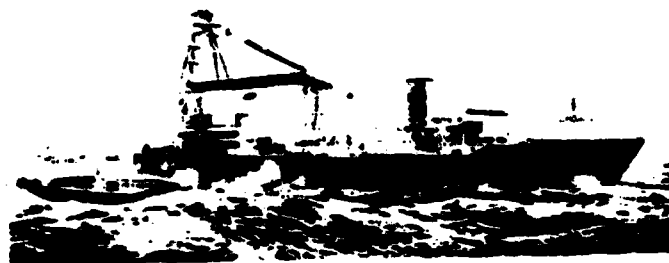


Fig. 5: The Soviets have acquired an option for another unit of the
1,600-ton lifting ship at the Finnish shipyard. The similarity with
the units of this type built at Blohm + Voss is conspicuous.

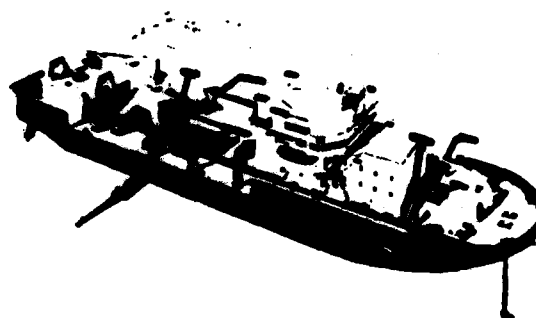


Fig. 6: The two suction dredges ordered at Wärtsilä can operate
in extremely shallow water.



Fig. 7: Suction dredge for operations in Siberian river mouths.
The ships have a draft of only 1.85 meters

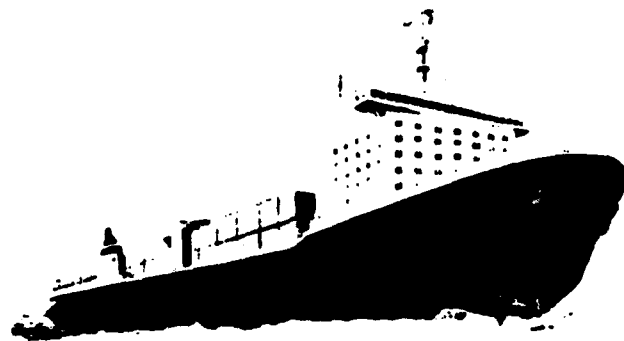


Fig. 8: The nuclear powered Soviet Lash-Carrier is reported to appear as above.

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Two suction dredges (Fig. 7) for operation in Siberian river mouths for delivery in 1984 have also been ordered at Wärtsilä/Turku. The capacity of the pumps is rated at $2 \times 10,000 \text{ m}^3/\text{h}$. Main dimensions of these new constructions are length 111.0 m, beam 16 m, draft 1.85 m, propulsion power 5,900 kW, speed 8.

The decision for the construction of a lash-carrier with nuclear power (Fig. 8) is regarded as being a spectacular innovation. It is also intended primarily for operations in Arctic waters. Its capacity is designed for carrying either 74 standard lighters or 1,330 20-foot containers. The main dimensions are: LOA 260.3, max. beam 32.2 m, draft 10.7 m in ice navigation, 29,420 kW power of the main turbine system, 20 kn speed in open water. The design features of the ship have special characteristics, which are dictated by operational requirements in the Polar ice and which differ from the conventional Lash-Type. Included in these characteristics are in particular the icebreaker form of the foreship and the unique stern design.

The Lash-Carriers, which are also designed for ice operations (Fig. 9), although they are not designed exclusively for ice operations, were built at the Cherson shipyard in the Black Sea. The first unit was named ALEKSEI KOSSYGIN. These ships with a length of 282 meters can carry either 82 Lash lighters or 1,480 20-foot containers. The propulsive power of the conventional main engine is reported as 24,700kW with a speed of 18.4 kn.

Five chemical products tankers (Fig. 10) scheduled for delivery 1983/ beginning of 1984 are being built by Rauma Repola for the Soviet Union. These ships will carry both oil products and methanol and other liquid cargoes. Special requirements are predicated so that safe operation is insured even at temperatures below -40°C . The ships with a length of 113.0 m, beam 18.30 m and draft 8.50 m can carry 5,750 tdw.

In the first half of 1982 the Wärtsilä/Turku shipyard delivered the largest hopper suction dredge (Fig. 11), which can operate under ice conditions. The pumps have a capacity of $26,000 \text{ m}^3/\text{h}$ and the hopper can be filled with dredged material in 20 to 50 minutes. The dredge, which is equipped with very sophisticated equipment, including electronic positioning, is 120 m long, beam 22.0 m, draft 8.0 m. The carrying capacity is 10,500 tdw, the hopper capacity 9,000 t, the maximum operating depth 30 meters.

The Wärtsilä and Valmet shipyards are building a rather large number /38 of very impressive ice-breaking multiple-purpose freighters (Fig. 12). The project has the designation SA-15. The hull of these new ships is similar to the hull of an icebreaker. The special hull form was developed after extensive experiments in the ice testing laboratory of Wärtsilä. Because of this the ships, which are designed to be operated at temperatures up to -50°C , can break through ice with a diameter of up to one meter at constant speed without the assistance of an icebreaker. In order to reduce the ice resistance, the multiple-purpose freighters in addition have an air-bubble system developed by Wärtsilä. The ships, which are 174 m long, beam 24,5 m, side height 15.2 m and draft 10.5, are powered by two diesel motors, which provide a speed of 17 kn in open water. In addition to bulk cargo, wheeled cargo (Ro/Ro) and containers (532 TEU = twenty-foot equivalent unit), the ships can also carry grain, coal or ore. The cargo hold capacity is $26,400\text{ m}^3$. Particularly high requirements are imposed upon the cargo-handling gear. In this regard the laterally installed angled ramp can be lowered directly onto the ice. Together with the air-cushion craft, which are also included in the equipment, and with this 17.4-meter long 5-meter wide and ca. 41-ton ramp, the ships are essentially independent of shore cargo-handling facilities.

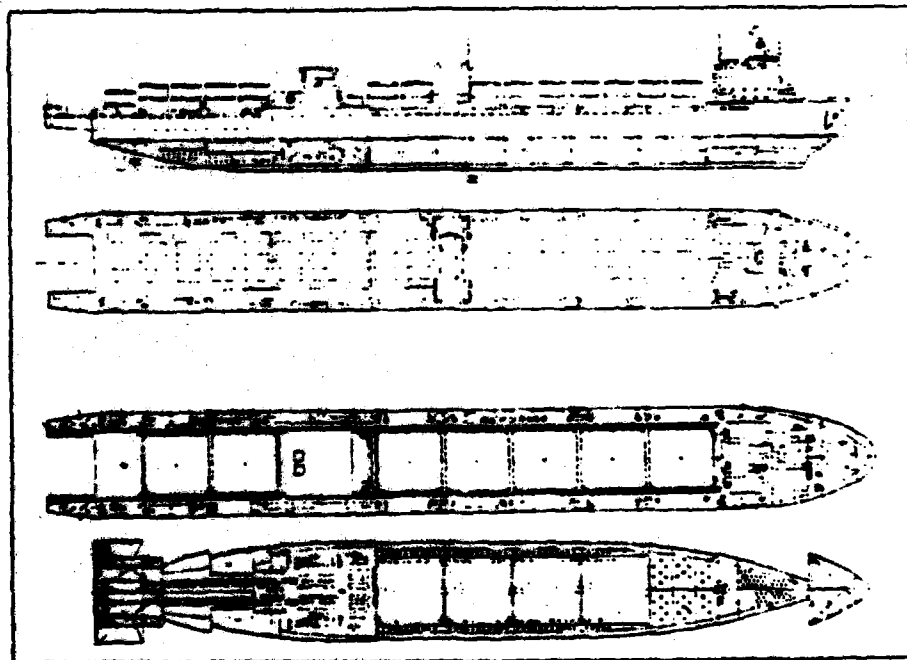


Fig. 9: Lash-carrier of the ALEKSEI KOSSYGIN Class:
Source: Sudostroyeniye 12/81.

As an example for the extensive maritime support capability, which the Soviet Union is developing in and for Arctic waters, the icebreaker-salvage and repair ships of the STROPTIVI Class are cited (Fig. 13). It would not be surprising on the basis of the listing to date if these ships were also built in Finland. These new ships are a completely new ship type. The primary missions for these ships are repair, fire-fighting, salvage and towing. The length of these ships is 72.2 m,

beam 18 m, draft 6,5 m, propulsive power 7,600 HP and speed in open water 15 kn. Equipment includes an electric towing winch with automatic control; for handling the mobile salvage pumps two each 5 and 3-ton deck cranes are provided; four foam projectors with each 400 m³/h can be used in fire-fighting and and two rudder-blades in conjunction with a 370-kW bow-thruster increase the maneuverability. A complete diver station with equipment for underwater welding and TV is provided. /381



Fig. 10: The spectrum ice-navigation special ships also includes chemical product tankers. They have also been ordered in Finland.

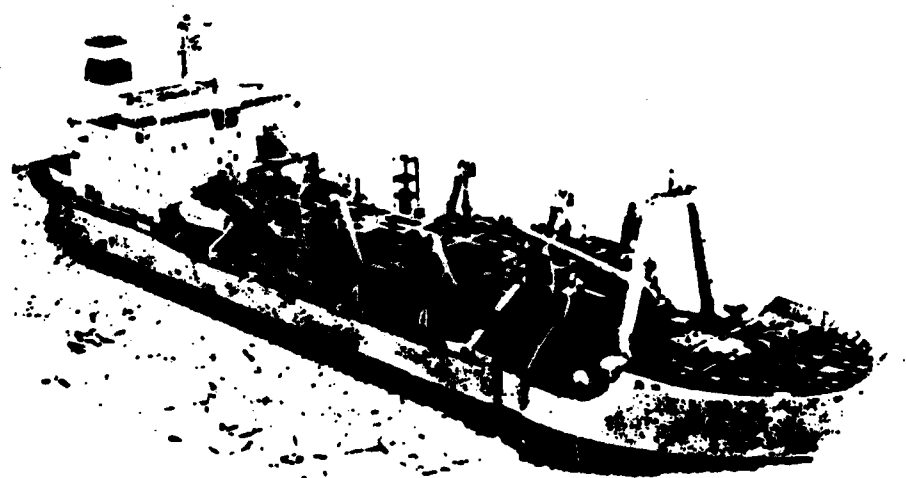


Fig. 11: The largest hopper-suction dredge, which can operated in ice conditions, was also built by the Finns.

The Harbors

Naturally, there are scarcely any details about the planned expansion of the harbors. In this regard, the Arctic region, the Northern Sea Route, are too far removed from the scope and observation of Western users or observers. What happens here is an "internal Soviet affair" in the most literal sense of the word. Indications and general statements of intent always indicate and also in regard to harbor construction much has to be done in order to make the predicated progress in the development and exploitation of the Northern regions.

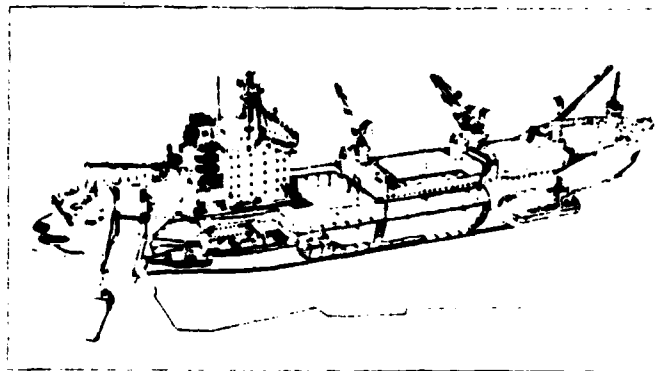


Fig. 12: A total of 14 of these ice-breaking multiple-purpose freighters, which are also equipped with air-cushion craft, have been ordered by the Soviet Unit at the Finnish Wärtsilä and Valmet shipyards.

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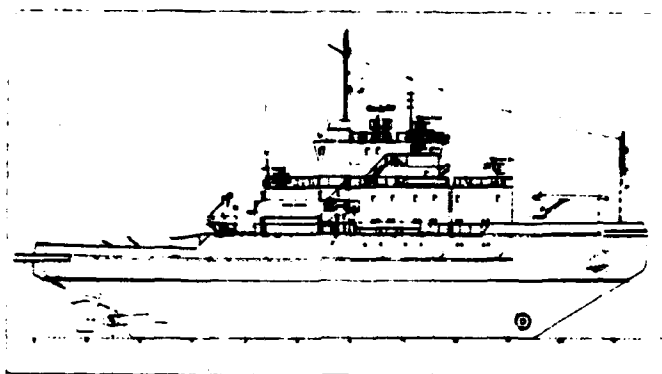


Fig. 13: Side view of the ice-breaker-salvage-and repair ships of the STROPTIVYI Class. All photos: Archiv Witthöft.

It can be noted that the expansion of the harbors Murmansk and Archangelsk enjoys a certain degree of priority. Further to the east, in Siberian Norilsk, modernization projects are in progress with the cargo-handing equipment. According to reports Norilsk will specialize in loading copper, nickle, zinc and other metals, which are produced there in the huge new blast furnaces.

In addition, the Soviet planners are planning the use of large lighters, which will be anchored off the Siberian coast as a type of floating mini-harbors, in order to supply the most remote industrial bases during the winter with technical equipment. According to the projections of the Maritime Administration, the barges loaded with special carriers will be brought from Murmansk to the assigned positions. As required, their freight could then be unloaded during the winter months. Approximately 50 to 60 of these lighters (barges) could go into position every year off the Siberian coast - according to the planners in Moscow, this would be cheaper than building a series of new harbors - particularly with reference to the prevailing climate.

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